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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:)
HOLT ET AL.)
) Examiner: J. Clinger
Serial No. **09/846,786**)
)
Filing Date: **May 1, 2001**)
)
Confirmation No. **5140**) Art Unit: 2821
)
For: **HIGH CAPACITY BROADBAND**)
CELLULAR/PCS BASE STATION)
USING A PHASED ARRAY ANTENNA)
)

DECLARATION UNDER 37 CFR \$1.131

Director, U.S. Patent and Trademark Office
Washington, DC 20231

Sir:

I, **ROBERT C. HILDEBRAND**, hereby declare that:

1. I am a joint inventor with Brian P. Holt and Julian Bartow Willingham of the subject matter of the above-referenced patent application.

2. We conceived in the United States while working at Harris Corporation in Melbourne, Florida, the subject matter of the above-referenced patent application prior to May 19, 1998, the effective filing date of the cited U.S. Patent No. 6,188,915, issued February 13, 2001.

3. We drafted a short description of the problem to be overcome and the invention details with appropriate drawings as set forth in Exhibit 1, pages 1-3. We later prepared a

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PowerPoint presentation setting forth in greater detail the invention and block circuit diagram as set forth in the drawing views shown in Exhibit 2, sheets 1-2. These exhibits illustrate a method of increasing the capacity of a base station and associated equipment using a phased array antenna containing antenna elements distributed in a multi-dimensional spatial array and the wideband digital radio having an operational bandwidth that contains the communication channels.

4. We worked diligently from the time of conception to the filing of the parent application serial no. 09/138,491 on August 24, 1998.

5. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

4 Feb. 2002
Date


ROBERT C. HILDEBRAND

PROBLEM: Broadband PCS/Cellular base stations that process wide bandwidth FDMA formats such as AMPS, GSM, USDC (IS-136) are either incompatible with neighboring frequency reuse patterns or are inefficient as they require a multiplicity of equipment, each providing only a fraction of it's potential capacity.

Discussion: The technique for sectorization is such that a cell can only employ certain RF channels in certain directions from the base station to minimize co-channel interference. For purposes of discussion we posit a GSM system with a 5 MHZ bandwidth (25 channels). A Conventional GSM system might employ a frequency reuse factor "K" of 4 with 120° sectorization. An adjacent service provider, already in place, would require compliance or accomodation of the K=4, 3 sector approach. This would allow only 2 of 25 RF channels to be used by the base station.

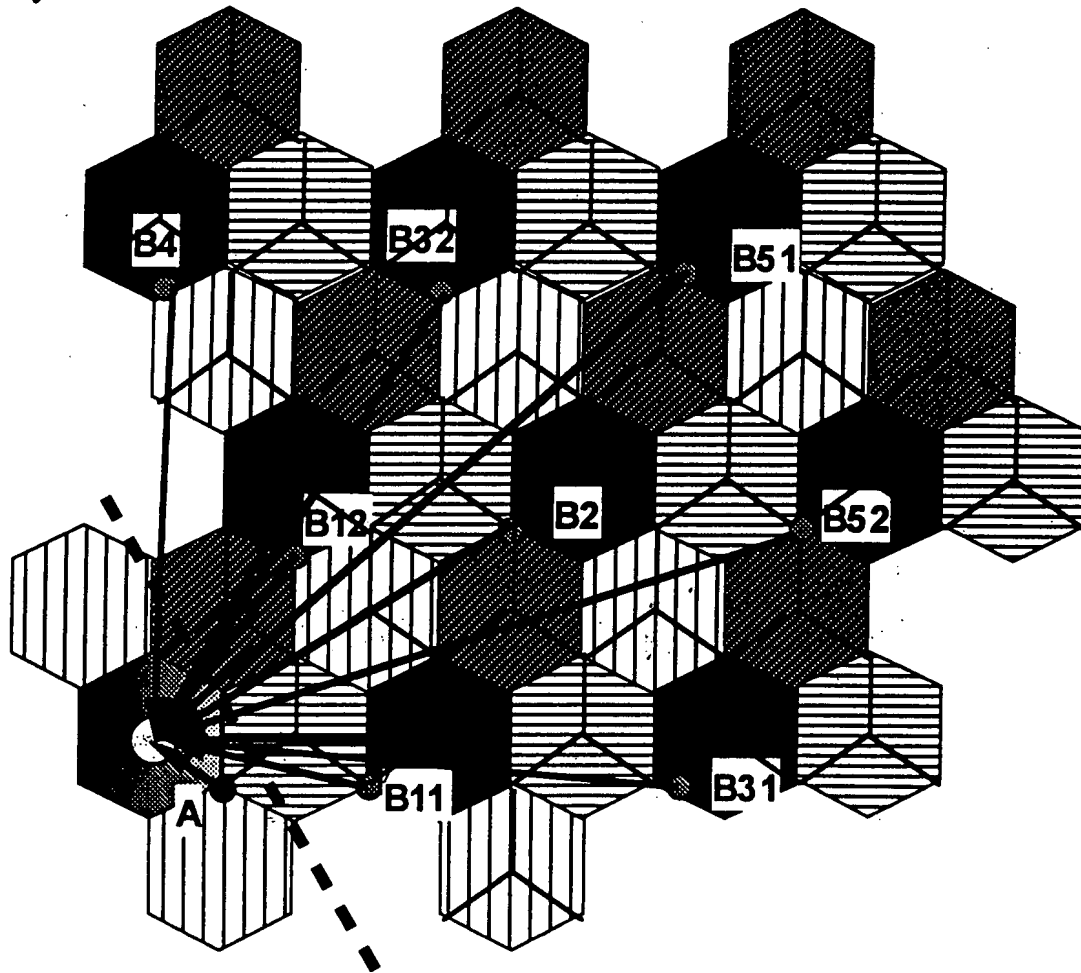
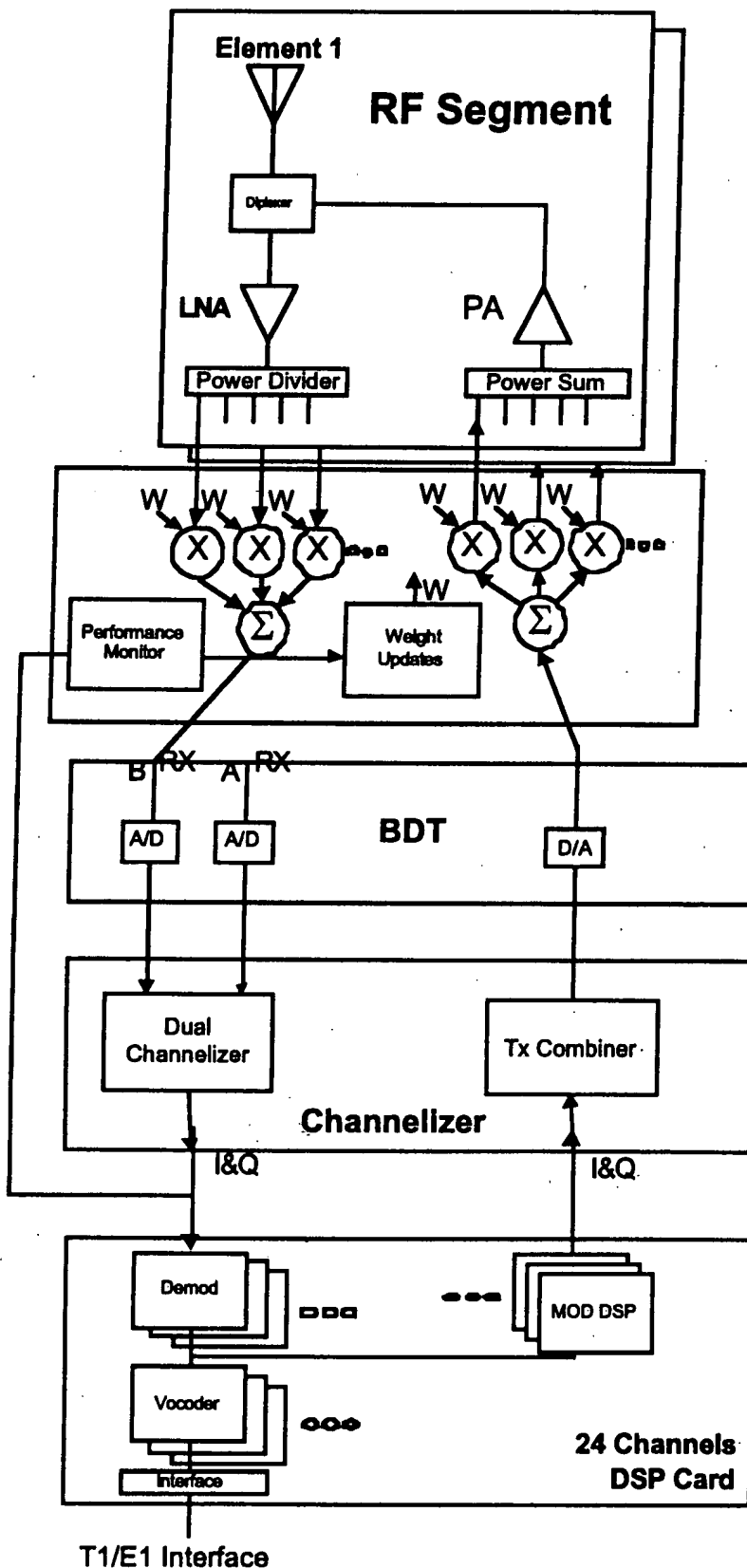


Figure 1- Reverse Channel from A is interfered with by mobile subscribers in the "B" cells.

Invention: The preferred approach is to employ a phased array antenna. On the Reverse Channel the array provides nulls in the direction of the co-channel interferers. On the forward channel, the array provides narrowbeam gain in the direction of the desired mobile subscribers, nulls in the general direction of the adjacent cell co channel users and low sidelobes to preclude harmful interference.



N Elements
22, 14, 10

Number of Weight and Combiners = 6
Number of RF Channel @ K=4

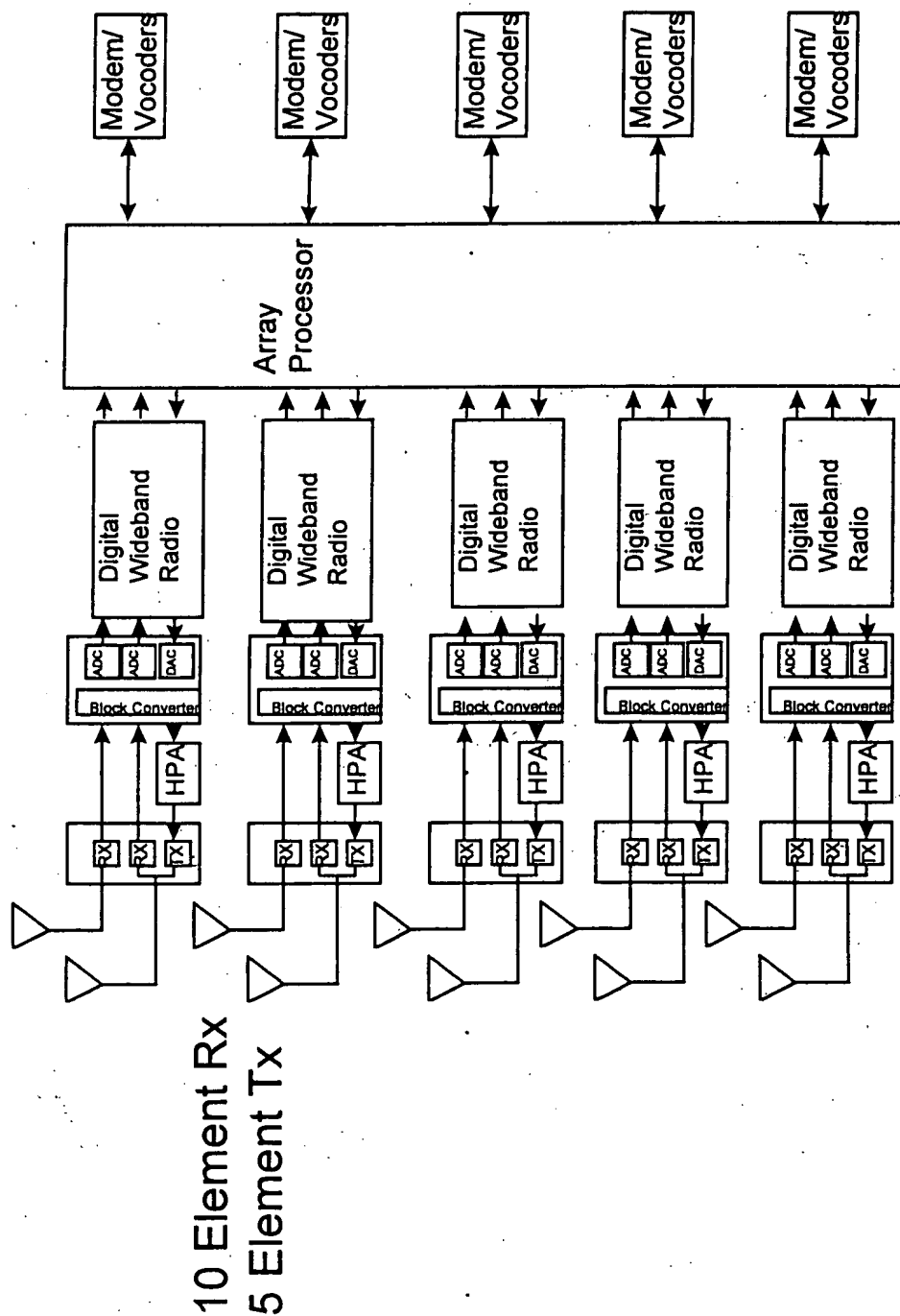
6 BDT Card

6 Channelizers

Number of DSP = 2
@ K=4
Gives 48 Voice Channels

RF Combiner Architecture

Phased Array Antenna with Wideband Radios



Description (cont'd) - Array Processor

